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TOTAL E&P PNG LIMITED

PAPUA LNG PROJECT

UPSTREAM ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1: MAIN REPORT

Chapter 14: Impacts - Cultural Heritage

TOTAL E&P PNG LIMITED

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14. Impacts: Cultural Heritage

14.1 Context

The Papua New Guinean National Museum and Art Gallery (NMAG) recently introduced a two-phase cultural heritage permitting system, requiring project proponents to first undertake cultural heritage mapping under the conditions of a Cultural Heritage Mapping Permit. Information obtained is then expected to inform targeted archaeological ground surveys conducted under the conditions of a second permit, 'Permit for Archaeological Survey in Papua New Guinea'[1].

Project cultural heritage mapping was conducted under conditions described in "Cultural Heritage Mapping Permit" (Number 001) issued by NMAG. The permit conditions allow cultural heritage researchers to conduct; (a) oral documentation of spatial arrangements of cultural properties, and (b) cultural heritage landscape mapping. The baseline studies adhered to permit conditions, and included cultural heritage mapping, involving interviews with local community representatives and field visits to accessible cultural heritage sites of interest. No targeted archaeological surveys were conducted during baseline studies. The information obtained during cultural heritage mapping; however, has and will continue to inform the second phase of cultural heritage impact mitigation carried out under the conditions of a 'Permit for Archaeological Survey in Papua New Guinea' (Phase two permitting).

All sites identified in and close to the Project area of influence (PAOI) are considered part of the culturally connected landscape[2] for the this cultural heritage impact assessment and; therefore, are a representative sample of site types that are present inside the PAOI in the absence of full archaeological surveys being undertaken at this time; however, a cultural heritage item, attribute or quality that is not in the direct Project footprint, is not directly assessed in this cultural heritage impact assessment.

Both tangible and intangible cultural heritage values were documented during baseline characterization (Chapter 9 and Part 17 of Volume 2). These results were based on cultural heritage mapping surveys being carried out in consultation with senior key informants representing 34 communities in the PAOI (see Part 17 of Volume 2).

Fourteen tangible cultural heritage sites were formally recorded during baseline mapping in the study area. These include ancestral village sites, spirit sites and one archaeological site. A further spirit site, given the name PRL-15 oxbow wetlands, was identified based on oral testimony but not formally recorded due to logistical constraints (e.g. aerial imagery was used to determine site dimensions).

Table 14.1 and Figures 14.1 and 14.2 show those tangible heritage sites as they relate to PRL-15, the river transport corridor and the export pipeline route.

1 Archaeological ground surveys involve systematically surveying infrastructure footprints and related areas to identify tangible cultural properties (e.g. archaeological sites), prior to the project construction phase.

2 In the context of this cultural heritage impact assessment, a culturally connected landscape is characterized as a living landscape, changing as the culture, climate and natural surroundings change in and around it. The character of the cultural landscape thus reflects the values of the people who have shaped it, and who continue to live in it.

Table 14.1 – Identified Tangible Cultural Heritage Sites

Site Name	Site Type	Location to Boundary*	Formally Recorded[3]	Assessed in this EIS
In and Around PRL-15				
Sasmeia	Spirit/ritual site	Outside	Yes	No
Wabo Kai Seiro	Spirit/ritual site	Outside	Yes	No
Subuia	Spirit/ritual site	Outside	Yes	No
PRL-15 oxbow wetlands	Spirit/ritual site	Inside	No	Yes
Moiwailedsa	Women's site	Outside	No	No
Pini sopu peido/Henaru tujemino	Spirit/ritual site	Inside	Yes	Yes
Sene Sopu Jono	Old Burial Platform site (not in use)	Inside	Yes	Yes
Sene Sopu Tou	Old Burial Platform site (not in use)	Inside	Yes	Yes
Sohopu Tepi	Spirit/ritual site	Inside	Yes	Yes
Peneturo	Spirit/ritual site	Inside	Yes	Yes
Urowai peido	Spirit/ritual site	Inside	Yes	Yes
Bwepolai peido	Spirit/ritual site	Inside	Yes	Yes
Saheilo	Ceremonial site	Inside	Yes	Yes
Tipeino/Tijana peido	Landmark	Inside	Yes	Yes
Mount Aioyu	Spirit/ritual site	Inside	Yes	Yes
River Transport Corridor				
Haralua	Ancestral village	Outside	Yes	No
Vaii Vavere	Ancestral village	Inside (Purari River banks)	Yes	Yes
Kauri Nu Poke	Ancestral village	Outside	No	No
Old Iare	Ancestral village	Inside (Purari River banks)	No	Yes
Mae	Spirit/ritual site	Outside	Yes	No
Lavi	Spirit/ritual site	Outside	Yes	No
Vaii Veruku	Spirit/ritual site	Outside	Yes	No
Vaukaea	Spirit/ritual site	Outside	Yes	No
Yemelavi	Spirit/ritual site	Outside	No	No
Alau Kaipu	Spirit/ritual site	Inside (Ivo-Uriko River banks)	No	Yes
Aua Euao	Spirit/ritual site	Inside (Ivo-Uriko River banks)	No	Yes
Akia Ini Laua complex, including Eere	Spirit/ritual site	Inside (Purari River banks)	Yes	Yes
Mairi Vaara	Spirit/ritual site	Inside (Purari River banks)	No	Yes

3 Tangible cultural heritage sites were recorded using standard site record sheets that document environmental settings and site characteristics. Site locations were recorded using handheld Garmin GPS units (WGS84 datum).

Table 14.1 – Identified Tangible Cultural Heritage Sites (cont'd)

Site Name	Site Type	Location to Boundary*	Formally Recorded[4]	Assessed in this EIS
Export Pipeline Route				
JP11 Pottery Sherd Scatter	Archaeological site	Outside	Yes	Yes (as part of Orokolo Bay culturally sensitive area)
Heve Hill cultural complex including JP11 Pottery Sherd Scatter and Nipa Stand Heve (spiritual)	Archaeological site	Outside	Yes	Yes (as part of Orokolo Bay culturally sensitive area)
Ape Ohoro	Spirit/ritual site	Outside	No	No
Kaukpa Horo	Ancestral Village	Outside	No	No
Irapuipiarumirie	Ancestral village	Outside	No	No
Popo	Ancestral village	Outside	Yes	Yes (as part of Orokolo Bay culturally sensitive area)
Maiaro	Ancestral village	To be confirmed	No	Yes (as part of Orokolo Bay culturally sensitive area)
Pottery sherds/stone tools	Archaeological site	Outside	Yes	Yes (as part of Orokolo Bay culturally sensitive area)

* Denotes the locations of sites in relation to the boundaries of PRL-15, the river transport corridor and the export pipeline route (see Figures 14.1 and 14.2).

Fifteen types of intangible cultural heritage values have been recorded under the classifications of language, oral traditions, spirit oral traditions, traditional song and dance, traditional dress, traditional subsistence knowledge and traditional medicines. Nineteen villages reported keeping ancestral heirlooms.

Baseline studies identified the PRL-15 oxbow wetlands spirit site, the Heve spirit site complex and the ancestral village of Popo as the three most significant tangible cultural heritage values inside the PAOI (see Chapter 9 and Part 17 of Volume 2). A review of archaeological research informed by geographic modeling suggests that the Muro Mission area in Orokolo Bay has the potential to contain internationally significant archaeological sites dating to the late Holocene. The export pipeline has been carefully routed to avoid these four culturally sensitive areas.

NMAG issued a permit for archaeological survey after baseline studies, with the following surveys being conducted:

1. Pre-reconnaissance cultural heritage mapping surveys in parts of Orokolo Bay, as reported in Muke et al. (2018). No cultural heritage sites were documented on the export pipeline route.

4 Tangible cultural heritage sites were recorded using standard site record sheets that document environmental settings and site characteristics. Site locations were recorded using handheld Garmin GPS units (WGS84 datum).

TANGIBLE CULTURAL HERITAGE SITES IN AND AROUND PRL-15

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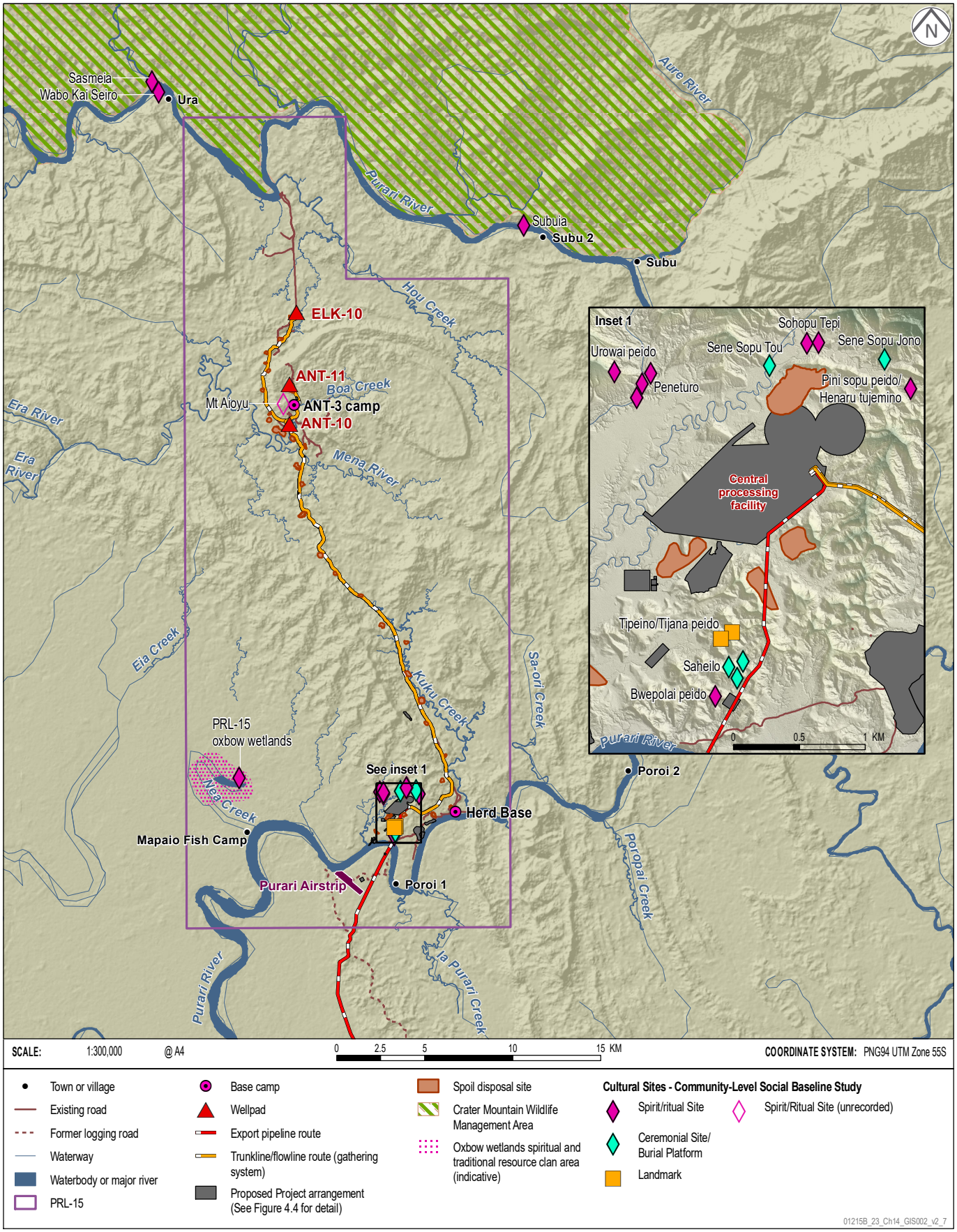
FIGURE 14.1



TANGIBLE CULTURAL HERITAGE SITES (RIVER TRANSPORT CORRIDOR/EXPORT PIPELINE ROUTE)

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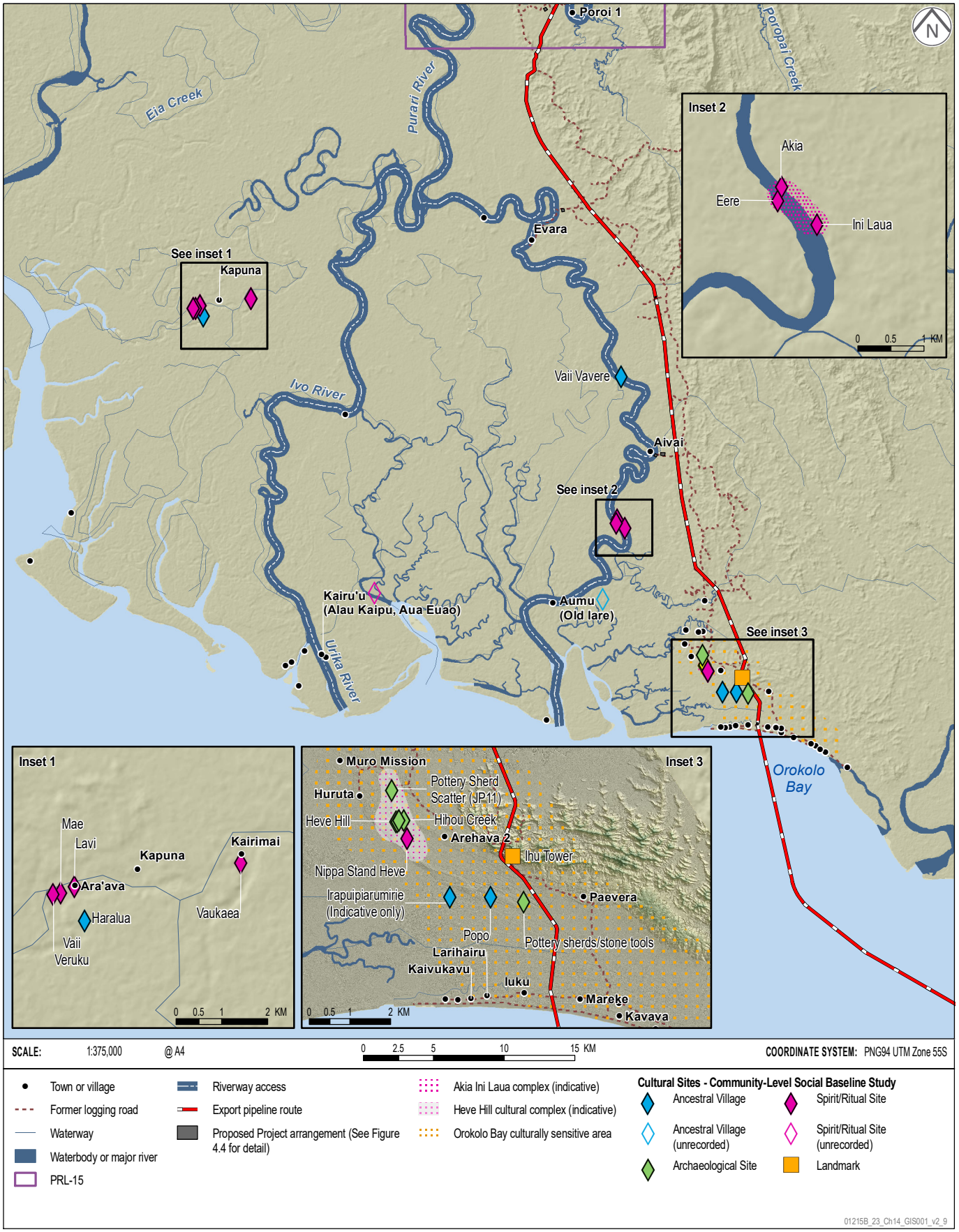
FIGURE 14.2



2. Archaeological surveys in the exclusion area including the proposed central processing facility (CPF) in PRL-15, with nine cultural heritage sites adjacent to the actual footprint of the proposed CPF being recorded (see Figure 14.1), as reported in Sepe et al. (2017).

The Project has developed a Cultural Heritage and Chance Finds Procedure in anticipation of potential impacts associated with ground altering work activities and to prevent any damage and/or destruction of potentially sensitive cultural heritage and archaeological sites and objects. This procedure will guide company, contractors' and sub-contractors' employees on how to address tangible cultural heritage properties prior to and during works. The procedure describes the recommended actions, in the case of a chance find in the Project's footprint, with priority given to avoiding sites identified as highly sensitive and important.

14.2 Cultural Heritage Impact Assessment Method

The principal objective of the cultural heritage impact assessment is to provide an assessment of potentially positive and negative impacts on tangible and intangible cultural heritage arising from Project activities, and to identify measures to manage these impacts. This chapter identifies and assesses impacts based on:

- The regulatory framework presented in Chapter 2.
- Definitions of direct, indirect and induced impacts provided in Chapter 3.
- The Project description and associated activities presented in Chapter 4.
- The alternatives analysis which described how cultural sites were considered in Project design in Chapter 5.
- Interaction between the Project and the cultural heritage and archaeological environment described in Chapter 9 and Part 17 of Volume 2.
- Assessment of impacts to terrestrial and social environments, and ecosystems services described in Chapters 11, 13 and 16 respectively, and how these may influence cultural heritage impacts.

This chapter has been structured to be consistent with onshore Project activities that occur in three areas, as defined in Chapter 1, i.e., in and around PRL-15, the export pipeline route and the river transport corridor[5], and according to definitions of tangible and intangible cultural heritage as follows.

International Finance Corporation's Performance Standard 8 (IFC, 2012) defines tangible cultural heritage as:

(i) Tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.

(ii) Unique natural features or tangible objects that embody cultural values, such as groves, rocks, lakes, and waterfalls.

Intangible cultural heritage is defined as the practices, representations, expressions, knowledge and skills and the instruments, objects, artefacts and cultural spaces associated therewith that

5 Collectively these areas are referred to as the onshore Project area and occur in the Project Area of Influence (PAOI).

communities, groups and, in some cases, individuals recognize as part of their cultural heritage (United Nations Educational, Scientific and Cultural Organization (UNESCO, 2003).

The cultural heritage impact assessment has been conducted by firstly understanding receptors relevant to cultural heritage and the importance of cultural heritage values and then by assessing potential Project impacts whilst considering the magnitude of these potential impacts and the sensitivity of the cultural heritage receptor as described in the following sections.

14.2.1 Cultural Heritage Receptors

Social receptors relevant to cultural heritage are the individuals, communities or groups that can be affected by Project activities. Receptors in this cultural heritage impact assessment are defined according to the groups presented in Table 14.2.

Table 14.2 – Cultural Heritage Receptors

Receptor	Description
All Areas	
Unidentified tangible cultural heritage	Through Phase 2 permitting, unidentified tangible cultural heritage may be identified including (but not limited to) spirit, ancestral and archaeological sites, material culture and heirlooms (such as stone tools, shell valuables, clay pots and artefacts for example).
In and Around PRL-15	
Identified cultural heritage - PRL-15 oxbow wetlands	The PRL-15 oxbow wetlands is a spirit/ritual site that is traditionally accessed by communities from Poroi 2 (and others from Poroi 1 and 3 when permission is granted from Poroi 2), as a subsistence resource, particularly in times of food shortage and famine. The site is seen as part of the Poroi 2 community's culturally connected landscape (Part 17 of Volume 2).
Identified cultural heritage sites near the proposed CPF	The cultural heritage sites comprise spirit/ritual and potential ancestral village sites of significance to PRL-15 project affected communities.
Project-Affected Persons	Individuals or groups with legal or customary rights to land or physical assets in the Project footprint area, and whose cultural heritage could be affected by the Project land access.
Project-Affected Communities	Communities in or around PRL-15 whose cultural heritage could be affected by Project activities, including: Wabo, Wabo Station, Ura, Subu, Subu 2, Poroi 1, 2 and 3 and Mapaio Fish Camp.
River Transport Corridor	
Identified cultural heritage - Vaii Vaivere, Old Iare, Akia Ini Laua, Alau Kaipu and Aua Euao, and Mairi Vaara	Ancestral village sites Vaii Vaivere and Old Iare, and spirit sites Mairi Vaara and the Akia Ini Laua complex are located on/near the Purari River. The Alau Kaipu and Aua Euao spirit sites are located on the Ivo-Uriko River.
Vaii Vaivere, Old Iare, Akia Ini Laua, Alau Kaipu and Aua Euao, and Mairi Vaara Project-affected persons	Individuals or groups of persons who live in/near to or have legal or customary rights to land and assets in Vaii Vaivere, Old Iare, Akia Ini Laua, Alau Kaipu and Aua Euao, and Mairi Vaara and whose cultural heritage could be affected, directly or indirectly or through induced impacts due to Project activities.
Project-Affected Communities	Communities located along the Purari and Urika-Ivo rivers (the primary and secondary transport corridors) where their cultural heritage sites could be affected by barging activities, including: Apiope, Aumu, Aivai, Evara, Kaevaria along the Purari River, and Mapaio, Kairu'u, Akoma, Ikinu, along the Urika-Ivo River. Mapaio Fish Camp settlement and Poroi 1 are common to both distributaries on the river transport corridor.

Table 14.2 – Cultural Heritage Receptors (cont'd)

Receptor	Description
Export Pipeline Route	
Orokolo Bay culturally sensitive area	A prospective cultural heritage landscape with known archaeological sites of local, regional, national and international significance. It is viewed in this impact assessment, as representing a culturally connected landscape for the Orokolo Bay communities.
Project Affected Persons	Individuals or groups with legal or customary rights to land or physical assets in the Project footprint area, and whose cultural heritage could be affected by the Project land access.
Project-Affected Communities	Communities who live adjacent to the export pipeline route with cultural heritage that could be directly affected by Project activities, including: Hepere, Arehava 2, Paevera, Iuku and Mareke.

14.2.2 Cultural Heritage Value Importance

Cultural heritage property is protected under the *National Cultural Property (Preservation) Act 1965*; however, the degree to which importance is applied to cultural heritage varies greatly. International Finance Corporation (IFC, 2012) suggests as cultural heritage is not always documented or protected by law (and is mostly only understood through the knowledge held by relevant communities in the first instance), consultation with knowledgeable communities is an important means of identifying cultural heritage, documenting its presence and significance, assessing potential impacts and exploring mitigation options. Only when the significance of a cultural heritage value has been determined is it possible to determine how that value is best managed (Pearson & Sullivan, 1995).

Cultural heritage is not always documented; therefore, the importance of cultural heritage values has been assessed through a defined method which firstly considers value ratings provided by Project-affected communities during baseline consultation that attributed low, medium or high significance to their cultural heritage values. This is consistent with good international industry practice, whereby consultation is an important mechanism to obtain relevant information when cultural heritage has not been appropriately documented (IFC, 2012).

Table 14.3 provides a description of local importance ratings used by Project-affected communities.

Table 14.3 – Cultural Heritage Value Importance Ratings

Category	Description
High	The value likely plays a key role in defining and maintaining community identity and would be passed from generation to generation.
Medium	The value likely has a declining role in maintaining community identity and may not be passed from generation to generation.
Low	The value likely no longer contributes to maintaining community identity and is likely to be fading from community memory.

Local value categorization cannot always be the primary factor when determining the importance of cultural heritage value, as people who live near an intangible value may be (unconsciously) biased about the significance of that value (Ellis, 2011). For example, during baseline consultation some informants attributed low importance to language; however, language is attributed high importance at national and international scales.

Categorizing archaeological sites acknowledges their cultural context, with sites being given greater importance in this assessment, when they are known in oral traditions. A site that is

unknown in oral traditions and has low local importance may; however, have research potential that makes that site important at regional, national or international scales. Additional key factors that determine archaeological site importance are rarity of the particular site type, representativeness of an historic period, the potential for the site to be scientifically informative, the preservation state and whether the site is vulnerable to destruction (Bowdler, 1984).

For this reason, local value categorization has been considered in determining regional, national and international importance based on shared multi-village recognition, previously published anthropological or archaeological sources (including both Australia International Council on Monuments and Sites (ICOMOS, 2000 and UNESCO, 1972). Assessment at these different geographic scales captures aspects that may not be recognized locally.

Once geographic scales have been captured, cultural heritage values have been reassessed considering whether the cultural heritage value is non-replicable, replicable or critical based on the definitions in Table 14.4, which were sourced from IFC (2012).

Table 14.4 – IFC Cultural Heritage Value

Category	Description
Non-replicable	Non-replicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents or (ii) cultural heritage is unique or relatively unique in linking several periods in the same site.
Replicable	Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.
Critical	Critical cultural heritage consists of one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use or have used within living memory the cultural heritage for long-standing cultural purposes or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation.

The Papua New Guinean National Museum and Art Gallery (NMAG) will review this defined method of determining value importance (Figure 14.3) for its robustness and transparency in understanding the value importance of cultural heritage.

METHOD FOR DETERMINING CULTURAL HERITAGE VALUE IMPORTANCE

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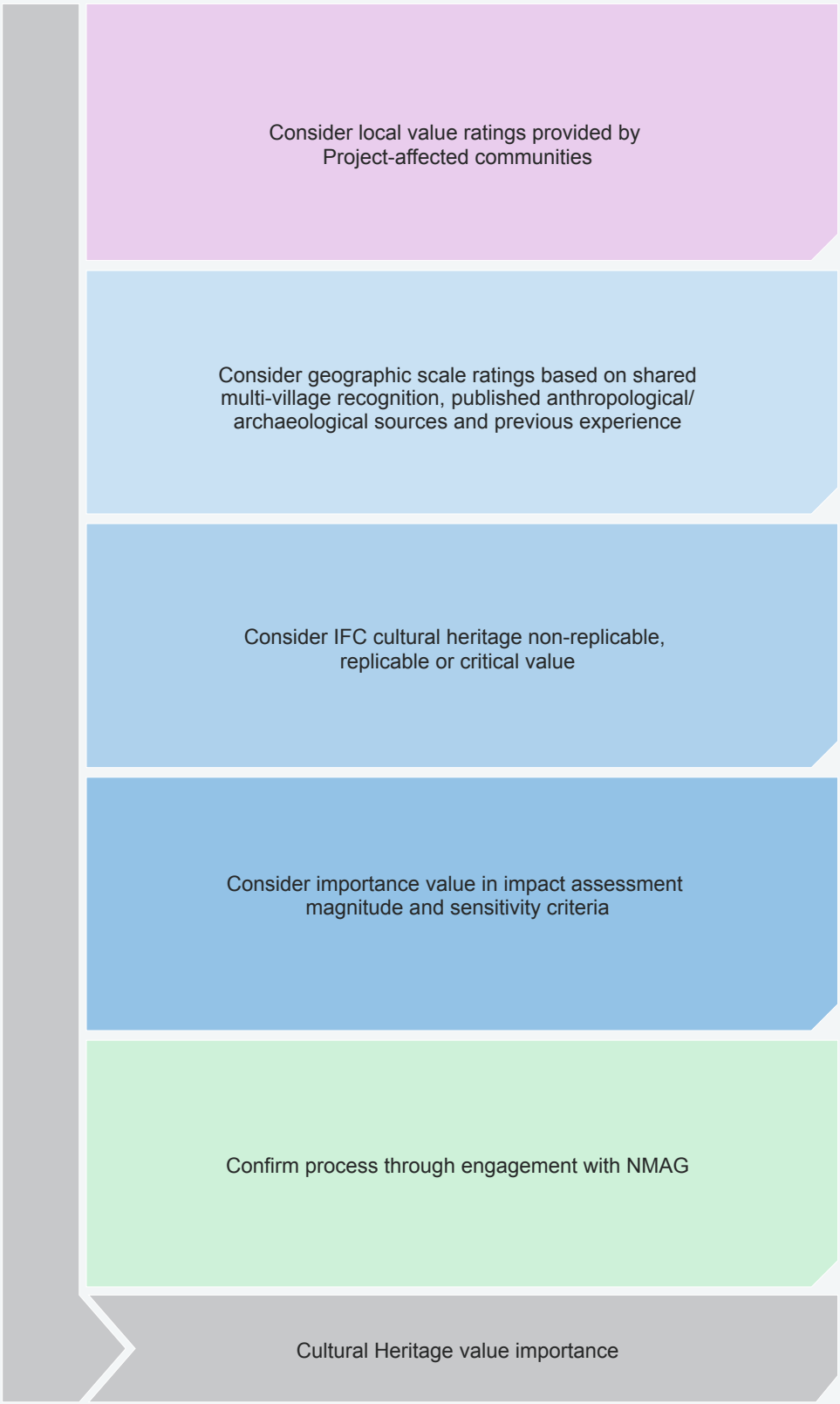
FIGURE 14.3



IFC = International Finance Corporation
NMAG = National Museum and Art Gallery

14.2.3 Cultural Heritage Impact Assessment Magnitude and Sensitivity

The value importance criteria described in Section 14.2.2 have been considered and used to define the magnitude and sensitivity criteria in Tables 14.5 and 14.6, respectively.

Table 14.5 – Cultural Heritage Impact Assessment Magnitude Criteria

Category	Description
Very High	♦ Irreversible and significant negative change, damage, loss or destruction to cultural heritage, compared to baseline conditions. ♦ Permanent and irreversible loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance is likely to be destroyed. ♦ Intangible cultural heritage and its value importance is likely to be permanently lost from community memory.
High	♦ Noticeable adverse change, damage, loss or destruction to cultural heritage, compared to baseline conditions. ♦ Permanent and irreversible loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance is likely to be damaged or partially destroyed, with some reinstatement possible through standard mitigation and management measures (Section 14.4). ♦ Intangible value importance is likely to be diminished, with some reinstatement possible through community-based management initiatives.
Medium	♦ Localized or limited change or damage to cultural heritage, compared to baseline conditions. ♦ Long term loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance may be damaged, with reinstatement possible through standard mitigation and management measures (Section 14.4), or as required under the Chance Find Procedure. ♦ Intangible value importance may be diminished, with reinstatement possible through community-based cultural heritage management initiatives.
Low	♦ Insignificant change to cultural heritage compared to baseline conditions. ♦ Temporary loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance will not be physically impacted but may be indirectly impacted (e.g., through loss of ancestral knowledge). ♦ Intangible value importance is maintained, consistent with local traditional practices and/or standard mitigation measures.
Negligible	♦ No impact to cultural heritage, compared to baseline conditions. ♦ No loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance will not be physically or indirectly impacted. No Project impact can be reasonably expected or anticipated. ♦ Intangible value importance will not be impacted. No Project impact can be reasonably expected or anticipated.
Positive	♦ Noticeable improvement to cultural heritage, compared to baseline conditions. ♦ No loss of access to sites that are used by Project-affected communities. ♦ Tangible value importance is enhanced through local village or community-based management initiatives that enhance intangible heritage values directly related to the tangible value. Archaeological excavations and analyses provide scientific knowledge to complement oral histories. ♦ Intangible value importance enhanced through village or community initiatives.

Table 14.6 – Cultural Heritage Impact Assessment Sensitivity Criteria

Category	Description
High	♦ Limited or no capacity to adapt to change. ♦ High vulnerability to changes in natural conditions (e.g. erosion, flooding, wave movement), to changes in environmental conditions (flora and fauna impacts), to changes in anthropogenic conditions (human interference, vehicular and recreational use). ♦ The item, attribute or quality is considered very important or is highly valued by the relevant community. ♦ Tangible value importance of international or national significance. Value that is *critical* or *non-replicable*, as defined in IFC (2012), and has high scientific value. ♦ Intangible value importance that is essential to maintaining cultural identity, is used by most community members and is being actively transferred to the next generation.
Medium	♦ Some resilience to changes in natural conditions (e.g. erosion, flooding, wave movement), to changes in environmental conditions (flora and fauna impacts), to changes in anthropogenic conditions (human interference, vehicular and recreational use). ♦ The item, attribute or quality is considered of medium value importance by the relevant community. ♦ Tangible value importance that is *replicable,* as defined in IFC (2012), and has medium scientific value. ♦ Intangible value importance that contributes to maintaining cultural identity, is used by most of the community or is being transferred to the next generation.
Low	♦ High resilience to changes in natural conditions (e.g. where relevant erosion, flooding, wave movement), to changes in environmental conditions (flora and fauna impacts), to changes in anthropogenic conditions (human interference, vehicular and recreational use). ♦ The item, attribute or quality is considered of low value importance by the relevant community. ♦ Tangible value importance that is *replicable,* as defined in IFC (2012), and has minimal or no scientific value. ♦ Intangible value importance acknowledged by some members of a community that is not always being transferred to the next generation.

Table 14.7 identifies tangible heritage sites discussed in the impact assessment and the sensitivity ratings applied based on sensitivity criteria defined in Table 14.6. Discussion on how the sensitivity rating was assessed for the individual sites is given in Section 14.3.1.1 for sites in and around PRL-15, Section 14.3.1.2 for sites in the river transport corridor, and Section 14.3.1.3 in the export pipeline route.

Table 14.7 – Sensitivity of Tangible Cultural Heritage Sites

Site Name	Site Type	Sensitivity
In and Around PRL-15		
PRL-15 oxbow wetlands	Spirit/ritual site	Medium
Pini sopu peido/Henaru tujemino	Spirit/ritual site	Medium
Sene Sopu Jono	Old Burial Platform site (not in use)	Medium
Sene Sopu Tou	Old Burial Platform site (not in use)	Medium
Sohopu Tepi	Spirit/ritual site	Medium
Peneturo	Spirit/ritual site	Medium
Urowai peido	Spirit/ritual site	Medium

Table 14.7 – Sensitivity of Tangible Cultural Heritage Sites (cont'd)

Site Name	Site Type	Sensitivity
Bwepolai peido	Spirit/ritual site	Medium
Saheilo	Ceremonial site	Medium
Tipeino/Tijana peido	Landmark	Medium
Mount Aioyu	Spirit/ritual site	Medium
River Transport Corridor		
Vaii Vavere	Ancestral village	Medium
Old lare	Ancestral village	Medium
Alau Kaipu	Spirit/ritual site	Medium
Aua Euao	Spirit/ritual site	Medium
Akia Ini Laua complex, including Eere	Spirit/ritual site	Medium
Mairi Vaara	Spirit/ritual site	Medium
Export Pipeline Route		
Orokolo Bay culturally sensitive area (unidentified and not recorded) including pottery sherds/stone tools	Archaeological site	High
Maiaro (not recorded)	Ancestral village	High

A matrix combining the magnitude of impact category with the sensitivity of value category (Table 14.8) then determines the significance of the impacts on cultural heritage due to the Project's activities, consistent with the impact assessment process outlined in Chapter 3.

Table 14.8 – Impact Significance Matrix for Cultural Heritage

Magnitude of Impact	Sensitivity of Value		
	High	Medium	Low
Very High	Severe	Major	Moderate
High	Major	Moderate	Moderate
Medium	Moderate	Moderate	Minor
Low	Moderate	Minor	Minor
Negligible	Minor	Negligible	Negligible
Positive	Positive	Positive	Positive

14.3 Identification and Initial Assessment of Potential Impacts

Potential impacts to cultural heritage can be avoided or minimized through Project design which is based on a risk-management approach, considering geotechnical constraints (e.g., flooding, landslides risks, geohazards) and anticipating and avoiding, or where avoidance is not possible, minimizing environmental and social impacts (e.g., avoidance of sensitive features, physical and economic displacement, priority ecosystem services, and minimization of project footprint, land clearing and disturbance, emissions and discharges) [ED013]. For example, the Project footprint avoids culturally sensitive areas identified during baseline surveys, including the PRL-15 oxbow wetlands and Heve Hill cultural complex, the ancestral village of Popo and the Muro Mission area (see Figures 14.1 and 14.2).

Specific embedded design controls are identified throughout this section where they address potential impacts.

14.3.1 Tangible Cultural Heritage

14.3.1.1 In and Around PRL-15

Fifteen tangible cultural heritage sites (see Table 14.1) were identified in and around PRL-15. The PRL-15 oxbow wetlands (Poroi 2[6]) are located approximately 2 km northwest of the Purari River. The wetlands connect intermittently to the Purari River via Nea Creek, a former and now silting cut-off meander of the Purari River. As described in Section 5.7.1, the initial preferred site for the new airstrip north of the Purari River was rejected, as it carried potential significant adverse social, cultural and environmental impacts due to its closeness to the PRL-15 oxbow wetlands. This site is well beyond the Project disturbance areas in PRL-15 and will not be impacted. Barge Project construction activities for the wharf and barge movements will not restrict or change access to the site for Project-affected persons and communities.

The nine tangible cultural heritage sites recorded near the proposed CPF area comprised spirit (5), ceremonial (3) and landmark (1) sites. The proposed Project footprint avoids all these sites. Nonetheless, as three of these sites are located within 1 to 5 km of the export pipeline route and condensate valve station 1, there is potential, although unlikely, for indirect impacts (i.e., access/interference) to these identified tangible cultural heritage sites due to Project earthwork and related activities.

Further archaeological surveys were undertaken to the baseline studies reported in Part 17 of Volume 2, as reported in Sepe (2017) and Muke et al. (2018). No archaeological sites were found in the proposed Project footprint during surveys in the Elk-1 and ANT-3 gas field areas (Sepe, 2017).

PRL-15 has most likely always been sparsely populated; although, archaeological sites will not be entirely absent, as evidenced by the sites recorded around the CPF area. There is potential for sites to be discovered during the Project construction or operations phases. The Project has developed a Cultural Heritage and Chance Finds Procedure describing the recommended actions to implement in case of a chance find.

Project-affected persons and Project-affected communities in villages in and around PRL-15[7] maintain heirlooms that are significant material reminders of their ancestral pasts. The Project may lead to induced impacts to material culture and ancestral heirlooms if they become commodified in a cash economy due to Project employment and procurement potentially related to Project-induced influx and Project workers (including contractors).

Importance Ratings

Tangible cultural heritage value importance, relevant to PRL-15, is presented in Table 14.9.

6 The PRL-15 oxbow wetlands spirit site is traditionally accessed by communities from Poroi 2 (and others from Poroi 1 and 3 when permission is granted from Poroi 2), as a subsistence resource, particularly in times of food shortage and famine. The site is seen as part of the Poroi 2 community's culturally connected landscape (Part 17 of Volume 2).

7 Baseline surveys were conducted in villages including Ura, Wabo, Subu 2 and Poroi 2 (Part 17 of Volume 2).

Table 14.9 – In and Around PRL-15: Tangible Cultural Heritage Value Importance

Cultural Heritage Value	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
PRL-15 oxbow wetlands	High	Low	Low	Low	N/A	N/A	No
Pini sopu peido/Henaru tujemino; Sene Sopu Jono; Sene Sopu Tou; Sohopu Tepi; Peneturo; Urowai peido; Bwepolai peido; Saheilo; Tipeino/Tijana peido	High	Low	Low	Low	N/A	N/A	No
Mount Aioyu	High	Low	Low	Low	N/A	N/A	No
Ancestral heirlooms	High	Low	Low	Low	No	Yes	No

N/A: Not applicable.

Initial Impact Assessment

None of the identified sites in and around PRL-15 are in the Project footprint and therefore are not expected to be directly impacted by the Project.

The local Project-affected persons and communities, notably Poroi 1, have assigned high tangible cultural heritage valued importance to the nine sites in the vicinity of the proposed CPF area. These sites have some resilience to change, including the three sites (Tipeino/Tijana peido, Saheilo and Bwepolai peido) located closest to the proposed footprint (see Figure 14.1). Thus, the overall sensitivity ratings for the sites are assessed as ***Medium***. The Project footprint avoids all nine sites and they are not directly affected, but they could be indirectly disturbed by Project activities given their proximity to the Project footprint; therefore, a ***Low*** impact magnitude rating has been applied for all sites.

The PRL-15 oxbow wetlands site is considered to have some resilience to change, thus the overall sensitivity rating is assessed as ***Medium***. The site is completely avoided by the proposed development; therefore, an initial magnitude rating of ***Negligible*** is assigned.

The Mount Aioyu area located north of Woh Creek is considered to have some resilience to change, thus the overall sensitivity rating is assessed as ***Medium***. The site is completely avoided by the proposed development; therefore, an initial magnitude rating of ***Negligible*** is assigned.

Any loss of material culture, ancestral heirlooms and inventories through induced impacts related to Project employment and procurement, such as an increase in a cash economy leading to commodification of such material culture, is considered to be ***Medium*** in magnitude, as this would result in localized change from baseline conditions. Project-affected persons and communities, and local communities would remain somewhat vulnerable to this impact with no mitigation or management measures in place to prevent any such loss, hence a ***Medium*** sensitivity rating has been applied.

In summary, the initial impact assessment regarding tangible cultural heritage sites in PRL-15, based on these ratings, is as follows:

- Potential disturbance, loss, damage or restricted/changed access to tangible heritage sites in the vicinity of the CPF – ***Minor***
- Potential disturbance, loss, damage or restricted/changed access to PRL-15 oxbow wetlands – ***Negligible***.

- Potential disturbance, loss, damage or restricted/changed access to Mount Aioyu – ***Negligible***.
- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Moderate***.

14.3.1.2 River Transport Corridor

Two ancestral village sites known through ethnographic accounts or oral traditions were identified on the banks of riverways. These are Vaii Vaivere (Aivai village) and Old Iare (with possible ancestral links to Aumu village) on the Purari River, with the latter not formally recorded (see Figure 14.2).

Four spirit sites were also identified during baseline surveys, one of which was formally recorded; these are Akia Ini Laua and Eere (Aivai village) and Mairi Vaara (Poroi 1, 2 and 3 villages) on the Purari River, and Alau Kaipu and Aua Euao on the Ivo-Uriko River (see Figure 14.2).

Regarding tangible site occurrence generally in the waterways, there are likely to have been many short-term ancestral settlement sites close to the river transport corridor; however, no villagers reported finding archaeological materials during gardening activities. The lack of archaeological finds by villagers is likely either due to rapid rates of siltation causing archaeological materials that may be present on riverways to be deeply buried or else eroded by the river currents and washed downstream. Thus, unknown archaeological materials are unlikely to be uncovered during Project activities. There is also little potential for unknown spirit sites to be encountered during Project activities, as traditional spiritual values have declined in importance among river transport corridor villagers since the 1950s.

Those in the river transport corridor maintain heirlooms that are significant material reminders of their ancestral pasts. The Project may lead to induced impacts on material culture and ancestral heirlooms if they become commodified in a cash economy due to Project employment and procurement. Impacts of any such commodification would likely be indirectly felt by river transport corridor Project-affected communities, and local communities.

Further, increased barge movements associated with the construction phase have the potential to increase wash effects that could destabilize and cause erosion of the riverbanks thereby impacting the integrity of sites.

Importance Ratings

Tangible cultural heritage value importance relevant to the river transport corridor is presented in Table 14.10.

Table 14.10 – River Transport Corridor: Tangible Cultural Heritage Value Importance

Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Ancestral village – Vaii Vaivere (Aivai)	High	Medium	Low	Low	No	Yes	No
Ancestral village – Old Iare (Aumu)	High	High	Medium	Low	No	Yes	No
Spirit site – Akia Ini Laua and Eere	High	Low	Low	Low	N/A	N/A	No

Table 14.10 – River Transport Corridor: Tangible Cultural Heritage Value Importance (cont'd)

Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Spirit site – Alau Kaipu – Kairu'u	High	Low	Low	Low	N/A	N/A	No
Spirit site – Aua Euao – Kairu'u	High	Low	Low	Low	N/A	N/A	No
Spirit site – Mairi Vaara – Poroi 1, 2, 3	High	Low	Low	Low	N/A	N/A	No
Ancestral heirlooms	High	Low	Low	Low	No	Yes	No

N/A: Not applicable.

Initial Impact Assessment

Any loss of material culture, ancestral heirlooms and inventories through induced impacts related to Project employment and procurement, such as an increase in a cash economy leading to commodification of such material culture, is considered to be ***Medium*** in magnitude as this would result in localized change from baseline conditions. Project-affected persons and communities, and local communities would remain somewhat vulnerable to this impact with no mitigation or management measures in place to prevent any such loss, hence a ***Medium*** sensitivity rating has been applied.

The Project will increase the volume of barge traffic on the Purari River and, if needed, the Ivo-Uriko River, during construction, operations and decommissioning. Increased vessel wash has the potential to increase river bank erosion and may directly impact cultural heritages sites that are located on the river banks through damage and or loss of materials and site integrity. Any loss or damage to sites will impact the Project-affected communities use and/or connection to these sites. A ***Medium*** impact magnitude rating is applied, as any damage or loss is expected to cause potential localized adverse change from baseline conditions. The sites are considered to have some resilience to change, given the natural variation of the river levels throughout the years, even though the precise nature and location of most of these sites are unknown, hence a ***Medium*** sensitivity rating has been applied.

In summary, the initial impact assessment regarding river transport corridor tangible cultural heritage, based on these ratings, is as follows:

- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Moderate***.
- Potential disturbance to, loss or damage to ancestral village sites Vaii Vaivere (Aivai village) and Old Iare (Aumu) and the spirit sites Mairi Vaara (Poroi 1, 2 and 3 villages), Akia Ini Laua complex (Aivai), and the Alau Kaipu and Aua Euao (Kairu'u village) sites – ***Moderate.***

14.3.1.3 Export Pipeline Route

No cultural heritage sites were recorded along most of the export pipeline route. While no sites were recorded along the route itself, numerous and significant archaeological and cultural heritage sites have been found in the landscape surrounding the route in Orokolo Bay. Although these sites were carefully avoided during the design of the route and are therefore outside the Project disturbance footprint, an appreciation of their nature and significance, which follows here, is necessary to understanding the identification of potential cultural heritage impacts in the Orokolo Bay area.

Orokolo Bay contains landscapes with high archaeological potential. Informants from all 15 Orokolo villages reported regularly uncovering pieces of pottery when working in their gardens. Orokolo Bay has not been previously subjected to systematic archaeological surveys, and only three archaeological sites have been documented thus far, i.e., the Popo ancestral village, the JP11 Pottery Sherd Scatter, and archaeological materials inside the Heve cultural site complex (see Chapter 9). Popo ancestral village site is located approximately 2.7 km inland from the coast and some 860 m to the west of the export pipeline route and is known through ethnographic and archaeological research. It is possible that unknown archaeological sites related to or from the same period as Popo may be found inside the export pipeline route at a similar distance inland from the coast.

The Irapuipiarumirie ancestral village, which was described as being approximately 1 km west of Popo and thus 1.5 km west of the export pipeline route (see Figure 14.2). The Heve spirit site complex is approximately 1,950 m west of the export pipeline route and is considered highly significant to all 15 Orokolo Bay village communities. Consultation with community informants suggest cultural connections between this site and the Pottery Sherd Scatter (JP11) archaeological site approximately 750 m to its north and the Nippa Stand Heve spirit site approximately 500 m to its south (see Figure 14.2). The Irapuipiarumirie ancestral village, which was described as being approximately 1 km west of Popo and thus 1.5 km west of the export pipeline route (see Figure 14.2). The export pipeline route has been designed to avoid disturbance to all these sites (Chapter 5). Another ancestral village is Maiaro (not recorded), which was identified through consultations with informants from Larihairu and Kaivaku, however, its precise location is yet to be confirmed.

As described in Part 17 of Volume 2, modelling suggests that the coastline in Orokolo Bay has extended (prograded) to the south over the past few thousand years as the sediment bed-load carried by the Purari River has been deposited offshore. The archaeological implications of coastal progradation are that formerly beach-fronting ancestral villages occupied by seafaring communities over the past 3000 years are now at varying distances inland from the coast. The predictive mapping suggests that ancient habitation of and inland of Orokolo Bay was most likely associated with the Araimiri (beach ridges) and Malalaua (beach plains) land systems that parallel the coast and extend inland to Muro Mission (Part 17 of Volume 2, Section 4.3).

It is foreseen that deflated dunes some 1 to 2 km inland from the coast would have provided beach fronting settlement options during a period of heightened coastal seafaring 350 to 600 years ago. Archaeological sites from this period are likely to be ancestral *hiri* settlement sites. The *hiri* has become symbolic for Papua New Guinean national identity, and archaeological sites that contribute to understanding *hiri* origins can be nationally significant. Depending on site content and what that may contribute to understanding the ancestral *hiri* period, an ancestral *hiri* site may be replicable or non-replicable (see Table 14.4). Sites in the coastal hills further inland are most likely to be on hilltops. Any sites located in coastal hills will likely date to between 1,200 and 800 years ago. These remain poorly understood periods in Papuan history, and archaeological sites

from the period could therefore have national significance. The unrecorded Maiaro ancestral village site, recalled in oral traditions, may be one such site. Deflated dunes along the base of the hills may contain archaeological sites from the same period and could also contain Lapita[8] sites dating to 2,600 and 2,900 years ago. Although Lapita finds are possible along the northern edge of Orokolo Bay, landscape modeling suggests that the most likely place for Lapita sites to be found is on beach plains near Muro Mission, some 3.6 km west of the export pipeline route. Archaeological sites dating to the Lapita period would have national and international significance. Any Lapita site that may be discovered on the northern fringe of Orokolo Bay would be non-replicable.

Cultural heritage investigations in near-neighboring areas suggest that archaeological materials may be found where the export pipeline route traverses inland coastal hills and enters Orokolo Bay, an area described in this impact assessment as 'Orokolo Bay culturally sensitive area' (see Figure 14.2). This area is highly likely to have previously unidentified cultural heritage sites and thus is the main subject of impact assessment in this part of the Project area.

Any unidentified archaeological sites potentially within the export pipeline route may be at risk of loss, disturbance or damage from pipeline construction earthworks and vegetation clearance[9] leading to direct, indirect or induced impacts to Project-affected persons, communities and/or local communities in and around the export pipeline route.

The Project may lead to induced impacts on material culture and ancestral heirlooms if they become commodified in a cash economy due to Project employment and procurement. Impacts of any such commodification would likely be indirectly felt by export pipeline route Project-affected persons and communities along with local communities.

Importance Ratings

Tangible cultural heritage value importance relevant to the export pipeline route is presented in Table 14.11.

Table 14.11 – Export Pipeline Route: Tangible Cultural Heritage Value Importance

Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Ancestral village – Popo	High	High	High	Low	No	Yes	No
Heve Hill cultural complex	High	High	High	Low	No	Yes	No
Orokolo Bay culturally sensitive area	High	TBC	TBC	TBC	TBC	TBC	TBC
Ancestral village – Maiaro	High	TBC	TBC	TBC	TBC	TBC	TBC
Ancestral heirlooms	High	Low	Low	Low	No	Yes	No

TBC = to be confirmed.

8 There have been three major increases in cultural activity on the south coast of Papua New Guinea during the past 3,000 years. The earliest involved the arrival of Oceanic seafarers known as Lapita people who occupied beach-fronting locations along the south coast 2,600 to 2,900 years ago.

9 Understanding that forest area here is already disturbed due to existing logging activities.

Initial Impact Assessment

All identified ancestral village sites are outside of the export pipeline route and will not be materially impacted by the Project. The exact location of the ancestral village of Maiaro is yet to be determined.

Archaeological investigations in near-neighboring areas suggest that archaeological materials may be found where the export pipeline route traverses the landscape in the 'Orokolo Bay culturally sensitive area'; therefore, it is possible that currently unidentified cultural heritage sites could be potentially directly impacted during earthworks and vegetation clearance for the onshore pipeline construction in this area. Any such potential impacts could affect both Project-affected and local communities in and around the export pipeline corridor, particularly those near Orokolo Bay.

Currently unidentified, potential tangible cultural heritage value may be damaged; therefore, a ***Medium*** magnitude rating has been applied, as any damage to existing tangible cultural heritage would be an adverse change from baseline conditions. These potential unidentified sites could be related to either ancient *hiri* and Lapita periods, and could have national and international significance. Such sites or finds are deemed non-replicable, and highly valued by the local communities, thus cultural heritage would be highly vulnerable to impacts, hence a ***High*** sensitivity rating is applied. The same impact assessment magnitude and sensitivity criteria are applied to the Maiaro ancestral village site which has not yet been located.

Any loss of material culture, ancestral heirlooms and inventories through induced impacts related to Project employment, such as an increase in a cash economy leading to commodification of such material culture, is considered to be ***Medium*** in magnitude, as this would result in localized change from baseline conditions. Project-affected persons and communities, and local communities would remain vulnerable to this impact with no mitigation or management measures in place to prevent any such loss, hence a ***Medium*** sensitivity rating has been applied.

In summary, the initial impact assessment regarding export pipeline route tangible cultural heritage, based on these ratings, is as follows:

- Potential disturbance, loss, damage to Maiaro (not recorded) – ***Moderate***.
- Potential disturbance, loss or damage to unidentified tangible cultural heritage sites in the 'Orokolo Bay culturally sensitive area' – ***Moderate.***
- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Moderate***.

14.3.1.4 Summary of Identified Potential Impacts to Tangible Cultural Heritage

Based on the impact assessment magnitude and site sensitivity ratings, the main impacts and their overall initial impact assessment with regard to tangible cultural heritage is as follows:

- Potential disturbance, loss, damage or restricted/changed access to sites in the vicinity of the CPF.
- Potential disturbance, loss or damage to ancestral village sites Vaii Vaivere (Aivai village) and Old Iare (Aumu) and the spirit sites Mairi Vaara (Poroi 1, 2 and 3 villages), Akia Ini Laua complex (Aivai), and the Alau Kaipu and Aua Euao (Kairu'u village) sites.
- Potential disturbance, loss or damage to unidentified tangible cultural heritage sites in the 'Orokolo Bay culturally sensitive area'.
- Potential disturbance, loss, damage or restricted/changed access to Maiaro (not recorded).
- Potential loss of material culture, ancestral heirlooms and inventories through commodification.

14.3.2 Intangible Cultural Heritage

14.3.2.1 In and Around PRL-15

Project-affected persons and communities in and around PRL-15 (Poroi 1, 2 and 3, Mapaio Fish Camp, Purari Airstrip house, Wabo, Wabo Station, Ura, Subu, Subu 2) maintain intangible cultural heritage values in the form of the Pawaia and (some) lare languages (see Figure 9.2), oral traditions, oral histories, ritual practices, traditional knowledge about medicines and knowledge of the physical world related to subsistence activities.

Project-affected persons and communities in and around PRL-15 maintain a strong cultural identity based on the shared use of Pawaia and lare languages, which are being actively taught to the next generation in all PRL-15 villages surveyed. The promise of economic opportunity could be expected to stimulate in-migration, leading to increased use of *Tok Pisin* and a corresponding decline in the use of the Pawaia language, as happened during planning phases for the Purari River (Wabo) Dam Site and Reservoir Project in the 1970s (Egloff et al., 1978).

Traditional song and dance are attributed low local importance, as these heritage values are not being taught to the next generation and were not active during the baseline studies.

Oral traditions, particularly those with historical content, are attributed high local importance, as they contribute to cultural identify and justify ancestral rights to land. They are being actively taught to the next generation in all Project-affected communities in and around PRL-15 surveyed during baseline studies. Oral traditions are rated low on a regional, national and international scale, as the values are unknown outside local villages.

Traditional knowledge related to subsistence activities and medicines is attributed high local and low regional, national and international importance. People openly welcome economic development; although, they remain skeptical about the material benefits of economic change; and traditional knowledge related to subsistence practices is highly valued for providing ‘insurance’ against its unknown consequences and for maintaining independence from reliance on external economic factors.

Project-affected communities in and around PRL-15 surveyed have had limited historical contact with missionaries; consequently, intangible heritage values may be less resilient to Project impacts than values maintained in the river transport corridor or export pipeline route, which have experienced greater contact in the past. Intangible heritage values are particularly vulnerable to induced impacts from Project employment and procurement including in-migration, increased population mobility and economic change (see Chapter 13). These induced impacts have potential to occur during all Project phases.

Importance Ratings

Intangible cultural heritage value importance in and around PRL-15 is presented in Table 14.12.

Table 14.12 – In and around PRL-15: Intangible Cultural Heritage Value Importance

In and Around PRL-15 Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Languages – Pawaia and Iare	High	High	High	High	N/A	N/A	Yes
Oral traditions	High	Low	Low	Low	N/A	N/A	No
Traditional song and dance	Low	Low	Low	Low	N/A	N/A	No
Traditional medicines	High	Low	Low	Low	N/A	N/A	No
Traditional knowledge related to subsistence activities	High	Low	Low	Low	N/A	N/A	No

N/A: Not applicable.

Initial Impact Assessment

Project-affected persons, communities and local communities in and around PRL-15 may experience a decline in the use of Pawaia language, as a potential impact of Project-induced in-migration and without mitigation. The Pawaia language is assessed as having high vulnerability to change, is actively used and passed between generations, has a 'high' international importance, and can be considered 'critical' under IFC Performance Standard 8; therefore, a ***High*** sensitivity rating has been applied.

For the same reasons, the initial assessment of the significance of Project impacts to other forms of intangible cultural heritage (e.g., oral traditions, ritual practices, traditional practices, traditional medicines and traditional knowledge related to subsistence activities) are assessed as being ***Medium*** in magnitude and ***High*** in sensitivity. The exception is the ***Low*** sensitivity of traditional song and dance, which has already experienced a decline in practice.

In summary, the initial impact significance regarding PRL-15 intangible cultural heritage, based on these ratings, is as follows:

- A potential decline in the use of local languages and increased use of *Tok Pisin* – ***Moderate***.
- Potential changed traditional site use or access and; therefore, loss of ancestral knowledge related to identified and unidentified cultural heritage sites – ***Moderate***.
- A potential decline in the proportion of the population that is familiar with local cultural practices and subsistence activities – ***Moderate***.
- Potential disruption to or loss of the intergenerational transfer of local cultural knowledge, traditions and practices – ***Moderate***.
- A potential further decline in the proportion of the population that is familiar with local traditional song and dance – ***Minor***.

14.3.2.2 River Transport Corridor

River transport corridor communities maintain intangible cultural heritage values, as the languages, oral traditions, oral histories, ritual practices, traditional knowledge about medicines and the physical world related to subsistence activities.

Communities along the river transport corridor speak five languages belonging to the Trans-New Guinea family (i.e. Koriki, Iare, Ahia, Kaimare and Maipua (see Figure 9.2)). All communities, except for Evara, attribute high local importance to their languages. Informants representing

Evara attributed low importance to language, which may reflect the nearness of a logging camp. All languages are rated of high importance on a regional, national and international scale.

Previous historic contact and other external factors have already led to an increase in the use of *Tok Pisin* among river transport corridor communities, particularly among young people, many of whom regularly travel away from their villages for education or employment. All river transport corridor communities are passing on local languages to the next generation; although, increased in-migration may potentially cause an induced impact on the maintenance of these languages.

Traditional song and dance maintain medium to high local importance and are being actively taught to the next generation among most river transport corridor communities. Traditional song and dance are rated as low importance on a regional, national and international scale, as the values are unknown outside local villages.

Oral traditions, particularly those with historical content, are attributed high local importance, as they contribute to cultural identity and land ownership. Oral traditions are being actively taught to the next generation in communities along the river transport corridor and are rated low on a regional, national and international scale, as the values are unknown outside local villages.

Traditional knowledge related to subsistence activities and traditional medicines is attributed high local and low regional, national and international importance. These values are also being actively taught to the next generation; although, to a lesser extent than Project-affected communities in and around PRL-15.

The linguistic diversity of riverways communities where five separate indigenous languages are spoken results in these communities being potentially more vulnerable to Project impacts than Project-affected communities in and around PRL-15, and the export pipeline route communities where largely one or two local languages are spoken. Project impacts to local languages may be due to increased population mobility and social interactions that lead to increased use of *Tok Pisin*.

Importance Ratings

Intangible cultural heritage value importance relevant to the river transport corridor is presented in Table 14.13.

Table 14.13 – River Transport Corridor: Intangible Cultural Heritage Value Importance

River Transport Corridor Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Languages - Koriki, Iare, Ahia, Kaimare and Maipua	High	High	High	High	N/A	N/A	Yes
Oral traditions	High	Low	Low	Low	N/A	N/A	No
Traditional song and dance	Medium to High	Low	Low	Low	N/A	N/A	No
Traditional medicines	High	Low	Low	Low	N/A	N/A	No
Traditional knowledge related to subsistence activities	High	Low	Low	Low	N/A	N/A	No

N/A: Not applicable.

Initial Impact Assessment

Aivai and Apiope communities on the Purari river transport corridor may experience a decline in the use of local languages from induced impacts from Project induced in-migration; therefore, a ***Medium*** magnitude is applied. The Aivai community is in the Iare language group and the Apiope community is in the Maipua language group. A ***High*** sensitivity rating has been assigned, as these languages are assessed as having high vulnerability to change, are actively used and passed between generations, have a 'high' international importance, and can be considered 'critical' under IFC Performance Standard 8.

Intangible cultural heritage in the river transport corridor communities is actively being transferred to the next generation. The initial significance assessment of Project induced impacts to other forms of intangible cultural heritage (e.g., oral traditions, ritual practices, traditional practices, traditional medicines and traditional knowledge related to subsistence activities) are assessed as being ***Medium*** in both magnitude and sensitivity.

In summary, the initial assessment of impact significance without mitigation regarding river transport corridor intangible cultural heritage, based on these ratings, is as follows:

- A potential decline in the use of local languages and increased use of *Tok Pisin* – ***Moderate***.
- Potential disruption to or loss of the intergenerational transfer of cultural knowledge and practices – ***Moderate***.

14.3.2.3 Export Pipeline Route

The Orokolo Bay[10] communities extend from the coast inland to Hepere and are the only communities located along the export pipeline route. These communities maintain intangible cultural heritage values in the form of Orokolo language (see Figure 9.2), oral traditions, oral histories, ritual practices, traditional practices, traditional knowledge about medicines and knowledge of the physical world related to subsistence activities.

Orokolo language is rated high in importance to all Orokolo Bay communities, and on a regional, national and international scale. Orokolo villagers travel regionally for business purposes and many villagers permanently or temporarily reside outside of Orokolo Bay. Despite this, Orokolo communities are conscious of maintaining language and use Orokolo in all interactions with fellow speakers.

Traditional song and dance maintain medium-high local value and is being passed on to the next generation among most of Orokolo Bay communities. Traditional song and dance are rated as low importance on a regional, national and international scale, as the values are unknown outside local villages.

As described in Section 14.3.1.3, the coastline in Orokolo Bay has prograded to the south over the past few thousand years. The ethnographic effects of coastal progradation are regularly recalled in oral traditions of these coastal communities where formerly beach-fronting ancestral villages occupied by seafaring communities over the past 3,000 years are now at varying distances inland from the coast. Oral traditions are therefore attributed high local importance, as these values are important for clan identity and justify rights to land. Oral traditions are rated low on a regional, national and international scale, as the values are unknown outside local villages.

10 From a cultural heritage perspective, communities in the export pipeline corridor footprint identify as Orokolo Bay communities with their own cultural heritage identity (Part 17 of Volume 2).

Traditional knowledge related to subsistence activities and traditional medicines is attributed medium-high local and low regional, national and international importance. These values are being passed to the next generation in most villages.

Orokolo Bay villagers have demonstrated a cultural resilience to social and economic change compared to communities in and around PRL-15, and along the river transport corridor, and this is particularly evident in the maintenance of the Orokolo language.

Intangible heritage values maintained in Orokolo Bay and along the export pipeline route are potentially less vulnerable to Project impacts mentioned in this chapter, than those of the communities along the river transport corridor or in and around PRL-15, as Orokolo Bay villagers have experienced cultural change through seafaring exchange relationships for many centuries.

Orokolo Bay villagers have also demonstrated a cultural resilience to social and economic change that is particularly evident in the maintenance of the Orokolo language.

Importance Ratings

Intangible cultural heritage value importance relevant to the export pipeline route is presented in Table 14.14.

Table 14.14 – Export Pipeline Route: Intangible Cultural Heritage Value

Export Pipeline Route Cultural Heritage	Importance				IFC Standard 8 Value		
	Local	Regional	National	International	Non-replicable	Replicable	Critical
Language - Orokolo	High	High	High	High	N/A	N/A	Yes
Oral traditions	High	Low	Low	Low	N/A	N/A	No
Traditional song and dance	Medium	Low	Low	Low	N/A	N/A	No
Traditional medicines	High	Low	Low	Low	N/A	N/A	No
Traditional knowledge related to subsistence activities	High	Low	Low	Low	N/A	N/A	No

N/A: Not applicable.

Initial Impact Assessment

Interactions between Project construction activities and Orokolo Bay communities will be transitory and limited to a few months, as the onshore export pipeline and shore crossing are constructed in this area. Project effects on communities will likely relate to induced impacts from Project employment and procurement, including in-migration, increased population mobility and economic change. The initial significance assessment of these impacts to the maintenance of the Orokolo language is that Project-affected persons, communities and local communities around the export pipeline corridor will likely experience a limited change in the use of the Orokolo language without mitigation; therefore, a ***Medium*** magnitude has been applied. An initial ***High*** sensitivity rating has been applied; as the Orokolo language has already demonstrated some resilience to change.

The initial significance assessment of Project impacts to other forms of intangible cultural heritage (e.g. oral traditions, ritual practices, traditional practices, traditional medicines and traditional knowledge related to subsistence activities) are assessed as being ***Medium*** in both magnitude and sensitivity for the same reasons.

In summary, the initial impact significance without mitigation regarding export pipeline route intangible cultural heritage, based on these ratings, is as follows:

- A potential decline in the use of local language and increased use of *Tok Pisin* – ***Moderate***.
- A potential decline in the proportion of the population that is familiar with local cultural practices and subsistence activities – ***Moderate***.

14.3.2.4 Summary of Identified Potential Impacts to Intangible Cultural Heritage

The Project has the potential to adversely impact intangible cultural heritage as follows:

- A potential decline in the use of local languages and increased use of *Tok Pisin*.
- Potential changed traditional site use or access and therefore loss of ancestral knowledge related to identified and unidentified cultural heritage sites.
- A potential decline in the proportion of the population that is familiar with local cultural practices and subsistence activities.
- Potential disruption to or loss of the intergenerational transfer of local cultural knowledge and practices.

14.4 Proposed Mitigation and Management Measures

14.4.1 Tangible Cultural Heritage

Table 14.15 describes mitigation and management measures to reduce impacts to identified and unidentified tangible cultural heritage.

Table 14.15 – Tangible Cultural Heritage Mitigation Strategies and Management Plans

Potential Impact	Mitigation Strategy	Relevant Management Plan
Loss of material culture, ancestral heirlooms and inventories through commodification.	♦ Develop and implement archaeological clearance procedures related to all early works and construction activities. This will include: – Establishment of a buffer area around identified sensitive sites near the planned project facilities, prior to early works and construction activities, to avoid accidental or inadvertent impacts. – Management of potential direct impact to any known site where impact is unavoidable, in consultation with local affected communities. – A Chance Finds Procedure for managing the discovery of ancestral remains, burial sites, and human remains. – Other measures, e.g. on site-specific recording, marking, erosion prevention, relocation, clearance distances and monitoring.	Cultural Heritage Management Plan

Table 14.15 – Tangible Cultural Heritage Mitigation Strategies and Management Plans (cont'd)

Potential Impact	Mitigation Strategy	Relevant Management Plan
Disturbance, loss or damage to identified and unidentified tangible cultural heritage sites.	♦ Provisions for notification of relevant parties in case of chance finds, and the notification of relevant parties in case of direct impacts to any known site [CHM001]. ♦ Develop and enforce the Project Material Culture Policy, which prohibits Project workforce from obtaining items of material culture from local communities through purchase or by way of a gratuity [CHM002]. ♦ Maintain traditional access to significant cultural places through consultation with relevant communities [CHM003]. ♦ Appoint a Project cultural heritage officer during the construction phase to oversee the implementation of the chance finds procedure, to conduct training as appropriate and to act as key contact for Project workers and contractors on all matters related to cultural heritage [CHM004]. ♦ All sites proposed for development as part of the Project will be subject to a preconstruction survey to clearly identify acid sulfate soils, sensitive sites and habitats, e.g. roosting, breeding, nesting and threatened species sites, priority ecosystem services, archaeological sites, burial sites, sites of religious importance to be subject to specific mitigation measures [EM001] ♦ All Project personnel, workers, contractors and 3rd party operators will be educated during inductions and safety training about: – Fire risks, including the heightened risk during extreme drought years and smoking. – Wildlife values. – Weed, pathogen and animal pest hygiene and control measures. – Identification of cultural heritage, cultural heritage awareness, measures for avoiding impacts and the Chance Finds Procedure [EM028]. ♦ See also waterway erosion mitigations in particularly Table 11.22.	Cultural Heritage Management Plan

14.4.2 Intangible Cultural Heritage

Table 14.16 lists further management measures for potential impacts to intangible cultural heritage.

Table 14.16 – Intangible Cultural Heritage Mitigation Strategies and Management Plans

Potential Impact	Mitigation Strategies	Relevant Management Plan
A decline in the use of local language and increased use of *Tok Pisin*.	♦ Develop intangible cultural heritage workshops in collaboration with relevant Project-affected communities, with guidance and oversight provided by cultural heritage specialists [CHM005]. ♦ All Project personnel, workers, contractors and 3rd party operators will be educated during inductions and safety training about: – Fire risks, including the heightened risk during extreme drought years and smoking.	Cultural Heritage Management Plan
Changed traditional site use or access and therefore loss of ancestral knowledge related to cultural heritage sites (identified and unidentified).		

Table 14.16 – Intangible Cultural Heritage Mitigation Strategies and Management Plans (cont'd)

Potential Impact	Mitigation Strategies	Relevant Management Plan
A decline in the proportion of the population that is familiar with local cultural practices and subsistence activities.	– Wildlife values. – Weed, pathogen and animal pest hygiene and control measures. – Identification of cultural heritage, cultural heritage awareness, measures for avoiding impacts and the Chance Finds Procedure [EM028]. ♦ See also in-migration mitigations in Chapter 13.	Cultural Heritage Management Plan
Disruption to or loss of the intergenerational transfer of cultural knowledge and practices.		

14.4.3 Stakeholder Engagement

Community consultations were completed for the cultural heritage baseline characterization, consistent with IFC (2012) (see Part 17 of Volume 2). Engagement will continue as part of ongoing cultural heritage management during the Project, as described in Tables 14.14 and 14.15 and further detailed in Chapter 6.

14.5 Assessment of Residual Impacts

The following section provides the assessment of residual impacts to landform and soils subject to the embedded design control in Section 14.3 and the successful implementation of the proposed mitigation and management measures in Section 14.4. A summary of the residual impact assessments is provided at the end of this section, including when and where (in which Project phase and location) these impacts are expected to occur.

14.5.1 Tangible Cultural Heritage

14.5.1.1 In and Around PRL-15

As described in Section 14.3.1.1, none of the identified sites in and around PRL-15 are in the Project footprint; however, several sites (rated as ***Medium*** sensitivity in Section 14.3.1.1) are located close to the footprints of the proposed CPF, export pipeline route and condensate valve station 1. The mitigation measures outlined in Table 14.15, implemented in consultation with the Project-affected communities and NMAG, will avoid any potential indirect impacts. The resultant impact magnitude rating applied is therefore ***Negligible***.

Any loss of material culture, ancestral heirlooms and inventories (rated as ***Medium*** sensitivity in Section 14.3.1.1) through induced impacts related to Project employment and procurement, such as an increase in a cash economy leading to commodification of such material culture, will be mitigated with the implementation of a Cultural Heritage Management Plan in addition to cultural heritage induction and awareness programs to employees and contractors. These specific mitigations and the others described earlier are designed to reduce the risks of material culture loss. The residual impact magnitude rating applied is ***Low.***

The residual impact significance regarding tangible cultural heritage in and around PRL-15, based on these ratings, is as follows:

- Potential disturbance, loss, damage or restricted/changed access to tangible sites around the CPF – ***Negligible***.
- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Minor***.

14.5.1.2 River Transport Corridor

The possibility remains that the currently identified Vaii Vaivere (Aivai village) and Akia Ini Laua complex and non-formally identified sites of Mairi Vaara (Poroi 1, 2, and 3), Old Iare (Aumu) and Alau Kaipu and Ava Euao (Kairu'u) sites (all rated as ***Medium*** sensitivity in Section 14.3.1.2) may be impacted by increased Project barging activities during all Project phases for reasons described previously. The potential resultant impacts may damage and erode sites due to wash from vessel movements. Section 11.3 describes the proposed mitigations to reduce riverbank erosion from vessel movements. These proposed mitigations, the cultural heritage mitigations described in Table 14.15, and particularly the archaeological clearance and community consultation to be implemented, as the Project development planning progresses, is expected to mitigate all potential impacts. The resultant impact magnitude rating applied is therefore ***Negligible***.

Any loss of material culture, ancestral heirlooms and inventories through induced impacts related to Project employment and procurement, such as an increase in a cash economy leading to commodification of such material culture, is now considered to be ***Low*** in magnitude and sensitivity with prohibition mitigation measures. Project-affected persons and communities along the riverways transport corridor are expected to be less vulnerable to this impact and in fact, may become adaptable to any change with measures implemented to prevent any such loss, hence a ***Low*** sensitivity rating has been applied.

The residual impact significance regarding river transport corridor tangible cultural heritage, based on these ratings, is as follows:

- Potential disturbance, loss, damage or restricted/changed access to Vaii Vaivere (Aivai village) and Akia Ini Laua complex and non-formally identified sites of Mairi Vaara (Poroi 1, 2, and 3), Old Iare (Aumu), and Alau Kaipu and Ava Euao (Kairu'u) sites – ***Negligible***.
- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Minor***.

14.5.1.3 Export Pipeline Route

The final approach of the export pipeline route to the coast crosses the Orokolo Bay culturally sensitive area that is assessed as being of ***High*** sensitivity due to the extent and importance of known and potentially unknown sites in the area at local, regional, national and potentially international levels. The likelihood exists that vegetation clearance and earthworks for onshore pipeline construction will intersect and disturb currently unknown sites in this area whose antiquity could potentially extend back to *hiri* and or Lapita periods based on the presence of known sites and the expected likely occurrence of other unknown sites from artifacts frequently uncovered by Project-affected communities. Proposed mitigation and management measures, notably pre-construction surveys in consultation with Orokolo Project-affected communities and NMAG, and the chance finds procedure, will focus on identifying any sites, to avoid and/or salvage. Nonetheless potential remains for localized damage to tangible cultural heritage, thus, a ***Low*** residual impact magnitude rating is given, until such time that archaeological survey is complete. The same impact assessment magnitude and sensitivity criteria are applied to the yet unknown Maiaro ancestral village site.

Project pre-construction surveys for archaeological clearance will include consultation with Orokolo Bay Project-affected communities to determine if possible, the location of the yet unknown Maiaro ancestral village site in relation to the export pipeline route footprint. Due consideration will be given to avoiding potential impact on the site during Project FEED and

detailed design if the site is in or near the disturbance footprint. This site cannot be assessed further, until the archaeological survey is complete.

Mitigation measures designed to educate and prohibit the Project workforce from procuring items of material culture from local communities will reduce the potential for loss of material culture, ancestral heirlooms and inventories (rated as ***Medium*** sensitivity in Section 14.3.1.3) through induced impacts related to Project employment and procurement, such as an increase in a cash economy leading to commodification of such material culture. This results in a ***Low*** magnitude rating, as any impact would represent a localized change from baseline conditions.

The residual impact significance regarding export pipeline corridor tangible cultural heritage, based on these ratings, is as follows:

- Potential disturbance, loss or damage to unidentified tangible cultural heritage sites in the Orokolo Bay culturally sensitive area – ***Moderate***.
- Potential disturbance, loss, damage or restricted/changed access to Maiaro ancestral village – ***Moderate***.
- Potential loss of material culture, ancestral heirlooms and inventories through commodification – ***Minor***.

14.5.2 Intangible Cultural Heritage

14.5.2.1 In and Around PRL-15

The possibility remains for various impacts on intangible cultural heritage to occur in and around the PRL-15 area due to social and economic reasons outlined in previous sections. The application of proposed measures in Table 14.16 is expected to minimize the declining use of the Pawaia and Iare languages among the Project-affected communities. Nonetheless, over time, the likely improvements in living standards of these communities afforded by State financial payments and increased employment (see Chapter 13) may encourage families to send their children to Port Moresby or other urban locations for schooling and advanced education.

The current generation of Pawaian and Iare speakers will continue to speak their traditional language; however, it can be foreseen that the next and future generations either educated or born in Port Moresby or other locations will struggle to speak their local language. While this decline in use is likely over time for Project-affected communities, the Pawaian language is unlikely to decline overall in the region, as it is spoken in other villages outside of the PAOI.

The decline in use of these languages in Project-affected communities has been rated ***Medium*** magnitude; and a ***High*** sensitivity rating has been applied (Section 14.3.2.1). All other intangible cultural heritage impacts are expected to be reduced through application of proposed mitigation measures and may be enhanced through increased engagement and documentation over time; hence, it has been rated ***Low*** in magnitude. A ***Medium*** sensitivity rating has been applied, as intangible cultural heritage is being transferred to the next generation. The residual impact significance regarding intangible cultural heritage in and around PRL-15, based on these ratings, is as follows:

- A potential decline in the use of local language and increased use of *Tok Pisin* – ***Moderate***.
- Potential changed traditional site use or access and; therefore, loss of ancestral knowledge related to identified and unidentified cultural heritage sites – ***Minor***.
- Potential disruption to or loss of the intergenerational transfer of cultural knowledge and practices – ***Minor***.

14.5.2.2 River Transport Corridor

The possibility remains for various impacts on intangible cultural heritage to occur in the river transport corridor area due to social and economic reasons outlined in previous sections. The preservation local languages among the river transport corridor communities is expected to be assisted with the application of proposed mitigation measures. Nonetheless, as two languages are currently spoken respectively by the Aivai and Apiope communities, it can be expected that Project employment and procurement would promote an increased adoption of *Tok Pisin,* as the favored language amongst these communities and with outsiders, thus, a ***Medium*** impact magnitude rating to language decline has been retained. A ***High*** sensitivity rating has been applied (Section 14.3.2.2).

All other intangible cultural heritage impacts to other forms of intangible cultural heritage (rated as ***Medium*** sensitivity in Section 14.3.2.2) are expected to be reduced through implementation of cultural heritage workshops and some may be enhanced with increased engagement and documentation over time; hence, this has been rated ***Low*** in magnitude.

The residual impact significance regarding river transport corridor intangible cultural heritage, based on these ratings, is as follows:

- A potential decline in the use of local languages and increased use of *Tok Pisin* – ***Moderate***.
- Potential disruption to or loss of the intergenerational transfer of cultural knowledge and practices – ***Minor***.

14.5.2.3 Export Pipeline Route

The possibility remains for various impacts to occur on intangible cultural heritage along the export pipeline route due to social and economic reasons outlined in previous sections. The decline in use of the Orokolo language; however, has been rated as ***Negligible*** magnitude, which is lower than in and around PRL-15 and river transport corridor areas, as the area currently maintains its local language despite existing changes. This is expected to continue with the application of relevant mitigation measures. ***High*** sensitivity has been applied (Section 14.3.2.3).

All other intangible cultural heritage impacts to other forms of intangible cultural heritage (rated as ***Medium*** sensitivity in Section 14.3.2.3) are expected to be reduced or avoided with application of proposed mitigation measures and may be enhanced with increased engagement and documentation over time; hence have been rated ***Negligible*** in magnitude.

The residual impact significance regarding the export pipeline route intangible cultural heritage, based on these ratings, is as follows:

- A potential decline in the use of local language and increased use of *Tok Pisin* – ***Minor***
- Potential disruption to or loss of the intergenerational transfer of cultural knowledge and practices – ***Negligible***.

14.6 Summary of Residual Cultural Heritage Impacts

A summary of the assessment of residual impacts to tangible and intangible cultural heritage is provided in Table 14.17, including in which Project phase and location these impacts are expected to occur. The table should be read with the specific mitigation measures provided in Tables 14.15 and 14.16.

All residual risk ratings are rated as either ***Minor*** or ***Negligible*** except for potential disturbance, loss or damage to unidentified tangible cultural heritage sites in the export pipeline corridor in the Orokolo Bay culturally sensitive area, and the potential loss of languages in and around PRL-15 and river transport corridor communities, which have both been rated as ***Moderate,*** after management and mitigation measures have been applied or implemented.

Project-related investment in cultural heritage may improve the retention of cultural knowledge in the Project area. This is not only a mitigation measure to minimize adverse impacts but can become a positive outcome compared with the current situation where such knowledge is poorly documented.

Table 14.17 – Summary of Assessment of Residual Impact Significance for Cultural Heritage

Key Sensitivity	Main Activity	Potential Impact	Direct/ Indirect/ Induced	Location of Activity/ Receptor	Project Phase	Mitigation and Management	Residual Assessment	
							Sensitivity/ Magnitude	Significance
Tangible Cultural Heritage								
Identified cultural heritage sites in the vicinity of CPF.	Earthworks, vegetation clearance	Potential disturbance, loss, damage or restricted/changed access to identified or unidentified tangible cultural heritage sites.	Direct	In and around PRL-15 Project-affected communities.	C, O, D	♦ CHM001 ♦ CHM002 ♦ CHM003 ♦ CHM004 ♦ EM001 ♦ EM028 ♦ See mitigations in Table 11.22.	Medium/ Negligible	Negligible
River transport corridor Vaii Vaivere, Akia Ini Laua complex, Mairi Vaara, Old Iare, Alau Kaipu, Ava Euao.	Logistics and transport – barges			River transport corridor Project-affected communities.	C, O		Medium/ Negligible	Negligible
Orokolo Bay culturally sensitive area sites and Maiaro ancestral village.	Earthworks, vegetation clearance			Export pipeline route Project-affected communities.	C, O		High/Low	Moderate
Ancestral heirlooms.	Project employment and procurement	Potential loss of material culture, ancestral heirlooms and inventories through commodification as an induced impact of Project employment and procurement.	Induced	In and around PRL-15 and export pipeline route Project-affected persons, Project-affected communities and local communities.	C, O, D	♦ CHM002 ♦ EM028	Medium/Low	Minor

Table 14.17 – Summary of Assessment of Residual Impact Significance for Cultural Heritage (cont'd)

Key Sensitivity	Main Activity	Potential Impact	Direct/ Indirect/ Induced	Location of Activity/ Receptor	Project Phase	Mitigation and Management	Residual Assessment	
							Sensitivity/ Magnitude	Significance
Ancestral heirlooms (cont'd)	Project employment and procurement	Potential loss of material culture etc.	Induced	River transport corridor Project-affected persons, Project-affected communities and local communities.	C, O, D	♦ CHM002 ♦ EM028	Low/Low	Minor
Intangible Cultural Heritage								
Language: Pawaia	Project employment and procurement	A potential decline in the use of local language and increased use of *Tok Pisin.*	Induced	In and around PRL-15 Project-affected persons, Project-affected communities and local communities.	C, O, D	♦ CHM005 ♦ EM028 ♦ See also in-migration mitigations in Chapter 13.	High/Medium	Moderate
Language: Koriki, Iare, Ahia, Kaimare, Maipua				River transport corridor Project-affected persons, Project-affected communities and local communities.			High/Medium	Moderate
Language: Orokolo				Export pipeline route Project-affected persons, Project-affected communities and local communities.			High/ Negligible	Minor
Cultural practices and subsistence activities	Project employment and procurement	Potential changed traditional site use or access and; therefore, loss of ancestral knowledge related to identified and unidentified cultural heritage sites.	Induced	In and around PRL-15 Project-affected persons, Project-affected communities and local communities.	C, O, D	♦ CHM005	Medium/Low	Minor

Table 14.17 – Summary of Assessment of Residual Impact Significance for Cultural Heritage (cont'd)

Key Sensitivity	Main Activity	Potential Impact	Direct/ Indirect/ Induced	Location of Activity/ Receptor	Project Phase	Mitigation and Management	Residual Assessment	
							Sensitivity/ Magnitude	Significance
Cultural practices and subsistence activities	Project employment and procurement	Potential disruption to or loss of the intergenerational transfer of cultural knowledge and practices.	Induced	In and around PRL-15 and river transport corridor Project-affected persons, Project-affected communities and local communities.	C, O, D	♦ CHM005	Medium/Low	Minor
				Export pipeline route Project-affected persons, Project-affected communities and local communities.			Medium/ Negligible	Negligible

C = Construction, O = Operations, and D = Decommissioning and closure.

14.7 References

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